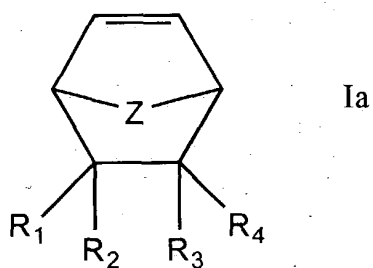
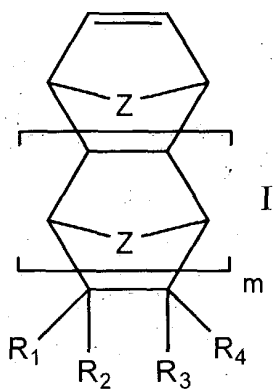


What is claimed is:

1. A photo-imageable composition comprising an acrylate-norbornene copolymer comprising from about 15 to about 90 mole% acrylate-type units and from about 85 to about 10 mole% norbornene-type units, one or the other of the acrylate-type units or norbornene-type units comprising an acid labile moiety.
2. The photo-imageable composition of Claim 1, where the norbornene-type units comprise norbornene, norbornadiene and compounds conforming to the general formulae I or Ia:



where m is an integer from 0 to 5; and Z represents oxygen, sulfur,  $-\text{NH}-$ , or  $-(\text{CH}_2)_p-$  where p is equal to 1 or 2;  $\text{R}_1$  to  $\text{R}_4$  are substituents independently selected from hydrogen, a halogen, linear or branched ( $\text{C}_1$  to  $\text{C}_{30}$ ) alkyls, linear or branched ( $\text{C}_1$  to  $\text{C}_{24}$ ) halohydrocarbyls, linear or branched ( $\text{C}_2$  to  $\text{C}_{30}$ ) olefins;  $-(\text{CH}_2)_n\text{C}(\text{O})\text{OR}^*$ ,  $-(\text{CH}_2)_n\text{C}(\text{O})\text{OR}'$ ,  $-(\text{CH}_2)_n\text{OR}$ ,  $-(\text{CH}_2)_n\text{OC}(\text{O})\text{R}$ ,  $-(\text{CH}_2)_n\text{C}(\text{O})\text{R}$ ,  $-(\text{CH}_2)_n-\text{OC}(\text{O})\text{OR}'$ ,  $-(\text{CH}_2)_n\text{C}(\text{R})_2\text{CH}(\text{R})(\text{C}(\text{O})\text{OR}^{**})$ ,  $-(\text{CH}_2)_n(\text{CR}_2)_n\text{CH}(\text{R})(\text{C}(\text{O})\text{OR}^{**})$ ,  $-(\text{CH}_2)_n\text{C}(\text{OR}^{***})(\text{CF}_3)_2$ ,  $-(\text{CR}'')_n\text{OR}$ ,  $-\text{CH}_2-[\text{O}(\text{CH}_2)_n]_{m^*}-\text{C}(\text{OR}^{***})(\text{CF}_3)_2$  and  $-(\text{CH}_2)_n\text{C}(\text{R})_2\text{CH}(\text{C}(\text{O})\text{OR}^{**})_2$ , and where R and R' can be hydrogen or linear and branched ( $\text{C}_1$  to  $\text{C}_{10}$ ) alkyls or hydroxy functional linear and branched ( $\text{C}_1$  to  $\text{C}_{10}$ ) alkyls, R'' can be hydrogen or a halogen; n and  $m^*$  are each an integer from 0 to 10;  $\text{R}^*$  is an acid labile moiety selected from the group consisting of  $-\text{C}(\text{CH}_3)_3$ ,  $-\text{Si}(\text{CH}_3)_3$ , isobornyl, 2-methyl-2-adamantyl, tetrahydrofuranyl, tetrahydropyrany, 3-oxocyclohexanonyl and mevalonic lactonyl groups;  $\text{R}^{**}$  is an independently selected R' or  $\text{R}^*$ , where R' and  $\text{R}^*$  are as defined above and  $\text{R}^*$  further includes tertiary ( $\text{C}_4$  to  $\text{C}_{20}$ ) alkyl and cycloalkyl groups, tri( $\text{C}_1$  to  $\text{C}_6$ ) alkylsilyl groups and oxoalkyl groups of 4 to 20 carbon atoms;  $\text{R}^{***}$  includes hydrogen,  $-\text{CH}_2\text{OR}'''$ ,  $-(\text{CH}_2)_{m^{**}}\text{C}(\text{O})\text{OR}'''$  or  $-\text{C}(\text{O})\text{R}'''$ , where  $\text{R}'''$  is methyl, ethyl, tert-butyl, cyclopentyl, cyclohexyl or other linear and branched ( $\text{C}_3$  to  $\text{C}_{10}$ ) alkyls and ( $\text{C}_4$  to  $\text{C}_{20}$ ) cycloaliphatics and  $m^{**}$  is 0 or 1.

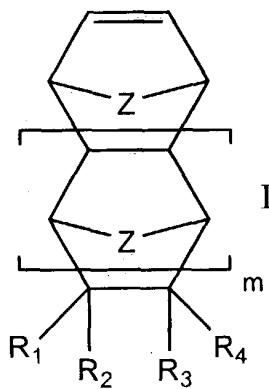
3. The photo-imageable composition of Claim 2, further comprising a photo acid generator and a solvent.
4. The photo-imageable composition of Claim 3, further comprising at least one of a dissolution rate modifier, a base quencher and/or a sensitizer.
5. The photo-imageable composition of Claim 4, where the acrylate-type units and/or the norbornene-type units comprise more than one type of acrylate-type unit and/or norbornene-type unit, respectively, and at least one of the acrylate-type units and/or the norbornene-type units comprise an acid labile moiety.

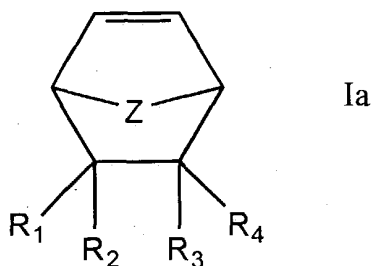
6. A photo-imageable composition comprising a polymer having from about 15 to about 90 mole% of acrylate-type units and from about 85 to about 10 mole% of norbornene-type units, where the acrylate-type units and/or the norbornene-type units comprise more than one type of acrylate-type unit and/or norbornene-type unit, respectively, and at least one of the acrylate-type units and/or the norbornene-type units comprise an acid labile moiety.

7. The photo-imageable composition of Claim 6, further comprising one or more additives selected from the group consisting of a photoacid generator, a solvent, a sensitizer, a base quencher and a dissolution rate modifier.

8. A method of forming a photo-imageable composition comprising:  
 causing an acrylate-type monomer and a norbornene-type monomer to polymerize to form a polymer, one or the other of the acrylate-type monomer or the norbornene-type monomer comprising an acid labile moiety;  
 dissolving the polymer in a solvent to form a solution; and  
 adding to the solution an additive selected from the group consisting of a photoacid generator, a solvent, a sensitizer, a base quencher and a dissolution rate modifier.

9. The method of Claim 8, where the norbornene-type monomer comprises norbornene, norbornadiene and compounds conforming to the general formulae I or Ia:





where m is an integer from 0 to 5; and Z represents oxygen, sulfur,  $\text{-NH-}$ , or  $\text{-(CH}_2\text{)}_p\text{-}$  where p is equal to 1 or 2;  $R_1$  to  $R_4$  are substituents independently selected from hydrogen, a halogen, linear or branched ( $C_1$  to  $C_{30}$ ) alkyls, linear or branched ( $C_1$  to  $C_{24}$ ) halohydrocarbyls, linear or branched ( $C_2$  to  $C_{30}$ ) olefins;  $\text{-(CH}_2\text{)}_n\text{C(O)OR}^*$ ,  $\text{-(CH}_2\text{)}_n\text{C(O)OR}'$ ,  $\text{-(CH}_2\text{)}_n\text{OR}$ ,  $\text{-(CH}_2\text{)}_n\text{OC(O)R}$ ,  $\text{-(CH}_2\text{)}_n\text{C(O)R}$ ,  $\text{-(CH}_2\text{)}_n\text{-OC(O)OR}'$ ,  $\text{-(CH}_2\text{)}_n\text{C(R)}_2\text{CH(R)(C(O)OR}^{**}\text{)}$ ,  $\text{-(CH}_2\text{)}_n\text{(CR}_2\text{)}_n\text{CH(R)(C(O)OR}^{**}\text{)}$ ,  $\text{-(CH}_2\text{)}_n\text{C(OR}^{***}\text{)(CF}_3\text{)}_2$ ,  $\text{-(CR}''\text{)}_2\text{nOR}$ ,  $\text{-CH}_2\text{-[O(CH}_2\text{)}_n\text{]}_{m^*}\text{-C(OR}^{***}\text{)(CF}_3\text{)}_2$  and  $\text{-(CH}_2\text{)}_n\text{C(R)}_2\text{CH(C(O)OR}^{**}\text{)}_2$ , and where R and R' can be hydrogen or linear and branched ( $C_1$  to  $C_{10}$ ) alkyls or hydroxy functional linear and branched ( $C_1$  to  $C_{10}$ ) alkyls, R'' can be hydrogen or a halogen; n and  $m^*$  are each an integer from 0 to 10;  $R^*$  is an acid labile moiety selected from the group consisting of  $\text{-C(CH}_3\text{)}_3$ ,  $\text{-Si(CH}_3\text{)}_3$ , isobornyl, 2-methyl-2-adamantyl, tetrahydrofuranyl, tetrahydropyranoyl, 3-oxocyclohexanonyl and mevalonic lactonyl groups;  $R^{**}$  is an independently selected R' or  $R^*$ , where R' and  $R^*$  are as defined above and  $R^*$  further includes tertiary ( $C_4$  to  $C_{20}$ ) alkyl and cycloalkyl groups, tri( $C_1$  to  $C_6$ ) alkylsilyl groups and oxoalkyl groups of 4 to 20 carbon atoms;  $R^{***}$  includes hydrogen,  $\text{-CH}_2\text{OR}'''$ ,  $\text{-(CH}_2\text{)}_{m^{**}}\text{C(O)OR}'''$  or  $\text{-C(O)R}'''$ , where  $R'''$  is methyl, ethyl, tert-butyl, cyclopentyl, cyclohexyl or other linear and branched ( $C_3$  to  $C_{10}$ ) alkyls and ( $C_4$  to  $C_{20}$ ) cycloaliphatics and  $m^{**}$  is 0 or 1.

10. The method of Claim 9, where the causing to form a polymer comprises an addition polymerization using a neutral or cationic Pd catalyst.

11. The method of Claim 10, where the causing to form a polymer comprises forming a polymer having from about 15 to about 90 mole% of acrylate units and from about 85 to about 10 mole% of norbornene units

12. The method of Claim 9, where the causing to form a polymer comprises forming a polymer having from about 15 to about 90 mole% of acrylate units and from about 85 to about 10 mole% of norbornene units, where the acrylate units and/or the norbornene units comprise more than one type of acrylate unit and/or norbornene unit, respectively, and at least one of the types of acrylate units and/or the norbornene units comprise an acid labile moiety.

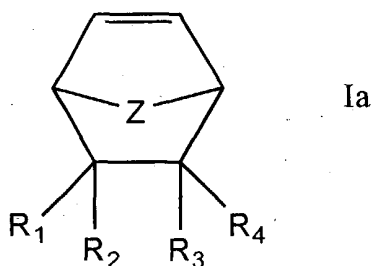
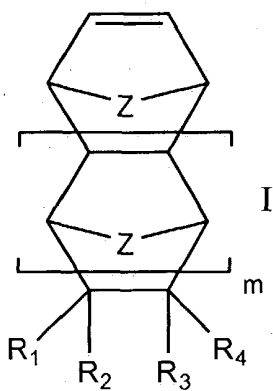
13. A method of forming a patterned structure on a substrate, comprising:

- providing a substrate;
- applying a photo-imageable composition to said substrate to form a layer of the photo-imageable composition on said substrate, the photo-imageable composition comprising:
  - an imageable polymer consisting essentially of from about 15 to about 90 mole% acrylate-type units and from about 85 to about 10 mole% norbornene-type units, one or the other of the acrylate-type units or norbornene-type units comprising an acid labile moiety; and
  - a photo acid generator;
- patternwise exposing the layer to radiation whereby acid is generated by said photosensitive acid generator in exposed regions of the layer by the radiation; and
- contacting the layer with an aqueous alkaline developer solution, whereby the exposed regions of the layer are selectively dissolved by said developer solution to form the patterned structure.

14. The method of forming a patterned structure of Claim 13, further comprising:  
 before providing the substrate, forming a material layer on the substrate,  
 the material layer comprising a material selected from the group consisting of a  
 semiconductor material, an insulating material and a conductive material;  
 applying the photo-imageable composition comprises applying the photo-  
 imageable composition on the material layer; and  
 transferring the patterned structure to the material layer to form a  
 patterned material layer structure.

15. The method of forming a patterned structure of Claim 14, where the  
 transferring comprises a reactive ion etch process.

16. The method of forming a patterned structure of Claim 14, where the  
 norbornene-type units of the imageable polymer comprise norbornene,  
 norbornadiene and compounds conforming to the general formulae I or Ia:



where m is an integer from 0 to 5; and Z represents oxygen, sulfur,  $\text{-NH-}$ , or  $\text{-(CH}_2\text{)}_p\text{-}$  where p is equal to 1 or 2;  $\text{R}_1$  to  $\text{R}_4$  are substituents independently selected from hydrogen, a halogen, linear or branched ( $\text{C}_1$  to  $\text{C}_{30}$ ) alkyls, linear or branched ( $\text{C}_1$  to  $\text{C}_{24}$ ) halohydrocarbyls, linear or branched ( $\text{C}_2$  to  $\text{C}_{30}$ ) olefins;  $\text{-(CH}_2\text{)}_n\text{C(O)OR}^*$ ,  $\text{-(CH}_2\text{)}_n\text{C(O)OR}'$ ,  $\text{-(CH}_2\text{)}_n\text{OR}$ ,  $\text{-(CH}_2\text{)}_n\text{OC(O)R}$ ,  $\text{-(CH}_2\text{)}_n\text{C(O)R}$ ,  $\text{-(CH}_2\text{)}_n\text{-OC(O)OR}'$ ,  $\text{-(CH}_2\text{)}_n\text{C(R)}_2\text{CH(R)(C(O)OR}^{**}\text{)}$ ,  $\text{-(CH}_2\text{)}_n\text{(CR}_2\text{)}_n\text{CH(R)(C(O)OR}^{**}\text{)}$ ,  $\text{-(CH}_2\text{)}_n\text{C(OR}^{***}\text{)(CF}_3\text{)}_2$ ,  $\text{-(CR}''\text{)}_2\text{nOR}$ ,  $\text{-CH}_2\text{-[O(CH}_2\text{)}_n\text{]}_m\text{-C(OR}^{***}\text{)(CF}_3\text{)}_2$  and  $\text{-(CH}_2\text{)}_n\text{C(R)}_2\text{CH(C(O)OR}^{**}\text{)}_2$ , and where R and R' can be hydrogen or linear and branched ( $\text{C}_1$  to  $\text{C}_{10}$ ) alkyls or hydroxy functional linear and branched ( $\text{C}_1$  to  $\text{C}_{10}$ ) alkyls, R'' can be hydrogen or a halogen; n and m\* are each an integer from 0 to 10; R\* is an acid labile moiety selected from the group consisting of  $\text{-C(CH}_3\text{)}_3$ ,  $\text{-Si(CH}_3\text{)}_3$ , isobornyl, 2-methyl-2-adamantyl, tetrahydrofuranyl, tetrahydropyranoyl, 3-oxocyclohexanonyl and mevalonic lactonyl groups; R\*\* is an independently selected R' or R\*, where R' and R\* are as defined above and R\* further includes tertiary ( $\text{C}_4$  to  $\text{C}_{20}$ ) alkyl and cycloalkyl groups, tri( $\text{C}_1$  to  $\text{C}_6$ ) alkylsilyl groups and oxoalkyl groups of 4 to 20 carbon atoms; R\*\*\* includes hydrogen,  $\text{-CH}_2\text{OR}'''$ ,  $\text{-(CH}_2\text{)}_{m^*}\text{C(O)OR}'''$  or  $\text{-C(O)R}'''$ , where R''' is methyl, ethyl, tert-butyl, cyclopentyl, cyclohexyl or other linear and branched ( $\text{C}_3$  to  $\text{C}_{10}$ ) alkyls and ( $\text{C}_4$  to  $\text{C}_{20}$ ) cycloaliphatics and m\*\* is 0 or 1.